TECHNICAL REVIEW DOCUMENT
For
MODIFICATION TO OPERATING PERMIT 97OPMF194

Questar Pipeline Company – Skull Creek Dew Point Plant
(Formerly Known as the Powder Wash Dew Point Plant)
Moffat County
Source ID 0810049

Prepared by Blue Parish
July 2011; Updated October 20, 2011

I. Purpose

This document establishes the basis for decisions made regarding the requested modifications to the Operating Permit for the Skull Creek Dew Point Plant. This document provides information describing the type of modification and the changes made to the permit as requested by the source and the changes made due to the Division's analysis. This document is designed for reference during review of the proposed permit by EPA and for future reference by the Division to aid in any additional permit modifications at this facility. The conclusions made in this report are based on the information provided in the original request for modification submitted to the Division on May 17, 2011 and various e-mail correspondence and telephone conversations with the source. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised construction permit.

II. Description of Permit Modification Request

Questar Pipeline Company (QPC) proposes to modify the existing facility by installing a Joule-Thompson valve and piping, a low temperature three-phase separator, an NGL product stabilizer tower with reboiler (heated by hot oil system), an electrically powered stabilizer overheads compressor, an NGL product cooler, a hot oil system with 1.65 MMBtu/hour heater and a gas-gas exchanger. QPC also proposes to replace the existing 375 hp Waukesha F3521GU engine used to generate electric power with a 607 hp Caterpillar G3412TA engine and to install a new emergency backup engine for power generation. The Natural Gas Liquids (NGL) product load-out pump and meter will also be upgraded. The modifications will allow the existing cold separator to operate at a lower temperature which will improve efficiency. Emission units at the facility affected by the modification include:

- GEN1 – new Caterpillar G3412TA engine (natural gas-fired), equipped with Non-Selective Catalytic Reduction (NSCR)
- GEN2 – new Cummins GTA855B emergency backup engine (natural gas-fired)
- P503 – Glycol Skid: increase gas throughput from 60 MMscfd to 70 MMscfd, and modify operating parameters of the unit
- F701 – Fugitive Components: although the total component count will be modified by the installation/modification of equipment, the existing permitted limit of 10 tons per year VOC is sufficient to handle the new component count and will not be modified in this action.
- TRK01 – Truck Loading of NGLs (new point): based on the requested amount of NGL loaded out, VOC emissions are above APEN thresholds of 2 tons per year (Regulation No. 3, Part A, Section II.D.1.a), and are therefore subject to the permitting requirements of Regulation No. 3, Part B.
- The new hot oil system heater (1.65 MMBtu/hr) Is exempt from APEN reporting requirements by Reg No. 3, Section A, II.D.1.k (less than 5 MMBtu/hr). This unit qualifies as an insignificant activity for operating permit purposes (Reg No. 3, Part C, Section IIE.3.k)

In addition to the upgrades noted above, QPC requested that the produced water pit be removed from the insignificant activities list (it has been replaced with a subsurface liquid knockout tank) and to change the name of the facility from Powder Wash Dew Point Plant to Skull Creek Dew Point Plant. These additional changes were requested in an email received on July 28, 2011. QPC also notified the Division on July 15, 2011 of a change in the responsible official.

Colorado Regulation No. 3, Part C, Section X.A identifies those modifications that can be processed under the minor permit modification procedures. Specifically, minor permit modifications “are not otherwise required by the Division to be processed as a significant modification” (Colorado Regulation No. 3, Part C, Section X.A.6). The Division requires that “any change that causes a significant increase in emissions” be processed as a significant modification (Colorado Regulation No. 3, Part C, Section I.B.36.h.(i)). Emission increases from the new and modified equipment are less than the PSD significance levels, and none of the monitoring requirements in the existing permit are being relaxed or removed. Questar submitted an application on May 17, 2011 requesting that the modification be processed as a minor modification; the Division agrees that the proposed changes qualify as a minor modification.

Emissions for the project are included in Attachment 1 at the end of this document.

Note that the facility had previously requested a minor modification on March 29, 2011 related to the GEN 1 engine. On January 11, 2011, the facility temporarily replaced the P303 engine with the current Waukesha F3521GU model engine (also 375 hp) with the intention of sending the P303 unit offsite for routine maintenance. During the maintenance activities, it was discovered that the original unit had reached the end of its useful life and could not be placed back in service. The purpose of the March 2011

permit modification was to permit the Waukesha F3521GU as a permanent replacement to the P303 Unit. The Division prepared a draft permit for this modification which completed a 45 day review period at EPA on May 19, 2011. However, the March 2011 permit revision was never actually issued as it is being superseded by the modification described herein.

Applicable Requirements – GEN1 (Caterpillar G3412TA Natural Gas-Fired, 4SRB Reciprocating Internal Combustion Engine Site Rated at 607 hp)

40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

Based on the APEN received on May 17, 2011, the date of manufacture for this engine is in 2009. It is therefore subject to the following emission standards:

- NOx – 2.0 g/hp-hr
- CO – 4.0 g/hp-hr
- VOC – 1.0 g/hp-hr

Subpart JJJJ requires an initial performance test and subsequent testing every 3 years or 8,760 hours, for engines not certified by the manufacturer. The owner or operator must keep a maintenance plan and maintenance records.

40 CFR 63 Subpart ZZZZ: National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

The Skull Creek Dew Point facility is an area (not major) source of Hazardous Air Pollutants (HAPs). This unit is categorized as a new engine at an area source (commenced construction after 6/12/2006 as per §63.6590(a)(2)(iii)). Subpart ZZZZ does not include specific requirements for new engines at area sources but instead requires that they meet the requirements of 40 CFR 60 Subpart JJJJ (§63.6590(c)(1)).

Colorado Regulation No 7, Section XVII – Statewide Controls for Natural Gas-Fired Reciprocating Internal Combustion Engines

Section XVII.E.2 contains the requirements applicable to new, modified and relocated engines, and Section XVII.E.3 contains requirements for existing engines. According to Regulation No. 7, Section XVII.B.4: Condensate tanks, dehydrators and internal combustion engines that are subject to an emissions control requirement in a federal maximum achievable control technology ("MACT") standard under 40 CFR Part 63, a Best Available Control Technology ("BACT") limit, or a New Source Performance Standard under 40 CFR Part 60 are not subject to this Section XVII. Therefore Regulation No. 7 requirements are not applicable.

40 CFR 64 – Compliance Assurance Monitoring (CAM)

This engine is equipped with NSCR for control of NO_x and VOC emissions. The potential to emit for NO_x of the engine, without controls, exceeds major source levels and the engine is subject to an annual limit on NO_x emissions. The unit is not a Large Pollutant-specific Emissions Unit (controlled NO_x emissions are less than 100 tpy). For

this unit, the CAM plan is required to be submitted as part of an application for renewal of the operating permit (§64.5(b)).

Other Applicable Requirements

- Emissions of air pollutants shall not exceed the following limitations based on rolling 12-month totals (as requested in an APEN submitted May 17, 2011):
  - NO_x 5.86 tpy
  - CO 11.72 tpy
- This engine is not a synthetic minor source in and of itself, and does not change the status of the facility with respect to operating permit, PSD or MACT applicability; therefore, monthly limits are not included.
- Natural gas consumption shall not exceed 35.3 MMscf per year based on rolling 12-month totals as requested in an APEN submitted May 17, 2011).
- Emissions shall not exceed 20% opacity (Colorado Regulation No. 1, Section A.II.1). Reg 1, Section A.II.4 also includes a 30% opacity requirement that applies to fire building, cleaning of fire boxes, soot blowing, start-up, Process Modification or Adjustment of Control Equipment. Fire building, cleaning of fire boxes and soot blowing do not apply to this unit. The control equipment does not control particulate matter, and the Division considers start-ups and process modifications for this unit unlikely to occur for longer than six minutes. Therefore, the 30% opacity requirement is not included in the permit.
- Periodic monitoring requirements are included in the permit to monitor compliance with the emission and fuel consumption limits, including: verification of heat content of the gas, inlet catalyst temperature, pressure drop across the catalyst, milivolt reading of the AFR and oxygen concentration in the engine exhaust. The permit also includes requirements for maintenance when catalyst inlet temperature and/or pressure drop falls outside the specified range.
- Quarterly portable monitoring for NO_x and CO will be required as per the Division's standard protocol.
- Reg 3, Part B, Section IV.G.4.a.(i) thru (ii) requires that construction of a source must commence within 18 months of initial approval permit issuance date or within 18 months of date on which such construction or activity was scheduled to commence as stated in the application. This condition, along with the requirements to notify the Division of startup and to certify compliance, apply to both new engines and are included as new condition 9 in Section II of the permit.

Applicable Requirements – GEN2 (Cummins GTA855B Natural Gas-Fired, 4SRB Reciprocating Internal Combustion Engine Site Rated at 354 hp)

This engine is an emergency generator and its Potential to Emit (PTE) is calculated at 500 hours per year in accordance with EPA's September 6, 1995 memo ("Calculating Potential to Emit (PTE) for Emergency Generators").

40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

Based on the APEN received on May 17, 2011, the date of manufacture for this engine is in 1995. Subpart JJJJ does not apply to owners or operators of emergency engines greater than 25 hp manufactured before January 1, 2009.

40 CFR 63 Subpart ZZZZ: National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

The Powder Wash Dew Point facility is an area (not major) source of Hazardous Air Pollutants (HAPs). This unit is categorized as a new engine at an area source (commenced construction after 6/12/2006 as per §63.6590(a)(2)(iii)). Subpart ZZZZ does not include specific requirements for new engines at area sources but instead requires that they meet the requirements of 40 CFR 60 Subpart JJJJ (§63.6590(c)(1)). Since no requirements apply under NSPS JJJJ, it is presumed that no requirements apply under MACT ZZZZ.

Colorado Regulation No 7, Section XVII – Statewide Controls for Natural Gas-Fired Reciprocating Internal Combustion Engines

Section XVII.E.1 of Reg. 7 states: The requirements of this Section XVII.E. shall not apply to any engine having actual uncontrolled emissions below permitting thresholds listed in Regulation Number 3, Part B. Potential NO_x, VOC and CO emissions for this emergency engine are less than 10 tons per year each, which are below the threshold of Part B, Section II.D.1.c.(iii)(B).

40 CFR 64 – Compliance Assurance Monitoring (CAM)

This engine is not equipped with a control device and is not subject to CAM.

Other Applicable Requirements

- Emissions of air pollutants shall not exceed the following limitations based on rolling 12-month totals (as requested in an APEN submitted May 17, 2011):
    - NO_x 3.83 tpy
    - CO & VOC – NA. Actual emissions are less than APEN reportable thresholds; therefore limits are not included in the permit.
- This engine is not a synthetic minor source in and of itself, and does not change the status of the facility with respect to operating permit, PSD or MACT applicability; therefore, monthly limits are not included.
- Hours of operation shall not exceed 500 per year based on rolling 12-month totals as requested in an APEN submitted May 17, 2011.

- Emissions shall not exceed 20% opacity (Colorado Regulation No. 1, Section A.II.1). Reg 1, Section A.II.4 also includes a 30% opacity requirement that applies to fire building, cleaning of fire boxes, soot blowing, start-up, Process Modification or Adjustment of Control Equipment. Fire building, cleaning of fire boxes and soot

blowing do not apply to this unit. The control equipment does not control particulate matter, and the Division considers start-ups and process modifications for this unit unlikely to occur for longer than six minutes. Therefore, the 30% opacity requirement is not included in the permit.

- Reg 3, Part B, Section IV.G.4.a.(i) thru (ii) requires that construction of a source must commence within 18 months of initial approval permit issuance date or within 18 months of date on which such construction or activity was scheduled to commence as stated in the application. This condition, along with the requirements to notify the Division of startup and to certify compliance, apply to both new engines and are included as new condition 9 in Section II of the permit.

Applicable Requirements – TRK01 (Truck Loadout from Pressurized Storage Tanks)

The facility used GRI HAPCalc 3.0 to estimate emissions from truck loadout from pressurized tanks. HAPCalc is based on equations from from AP-42 Chapter 5, 5th edition. An emission factor based on the HAPCalc results will be used to monitor compliance with the emission limit based on throughput. Calculations are based on loading in vapor balance service, with all captured vapors recycled to the pressurized tank. The facility is not a major source of HAPs so 40 CFR Subpart EEEE does not apply.

Applicable Requirements – P503 (Glycol Skid)

The facility is increasing max potential gas throughput from 60 MMscfd to 70 MMscfd and increasing the glycol recirculation rate from 1.7 to 2.5 gpm. Other operational parameters for the unit are also changing so that the emission limit is not affected by this modification.

III. Discussion of Modifications Made

- Updated Section I (General Activities and Summary) and the appendices containing the reporting formats to address the replacement engine, the new emergency backup engine, and truck loadout from pressurized tanks.
- Updated the responsible official information on the page following the cover page in accordance with a notification from the source received July 15, 2011
- Added a new set of Conditions (Section II, Condition 6) for the replacement generator engine (new GEN1)
- Added a new set of Conditions (Section II, Condition 7) for the new emergency backup generator engine (new GEN2)
- Added a new set of Conditions (Section II, Condition 8) for condensate loadout from pressurized tanks
- Added a set of Conditions (Section II, Condition 9) addressing Regulation No 3, Part B construction requirements for the new engines

- Updated Section II, Condition 2 (dehydrator) to address an increase in gas throughput of 10 MMscfd and updated the operating parameters for the unit.
- Updated Appendix A to include the hot oil system heater as an insignificant activity and to replace the produced water pit with the subsurface knock out tank.
- Throughout: changed the facility name from Powder Wash Dew Point Plant to Skull Creek Dew Point Plant.
- Note that the existing GEN1 engine (Waukesha F3521GU) remains in the permit under Section II, Condition 1 so that it may be operated until the new engine is in place. Condition 6.8 requires the existing GEN1 engine to be removed upon startup of the new unit, and for the Division to be notified.

IV. Update – October 20, 2011

The EPA review period ended on September 18, 2011. Following this review period, the applicant noted the following errors on the proposed permit:

- The Table in Section II, Condition 6.1 had a typo and should read “Portable Flue Gas Analyzer” instead of “Portable Fuel Gas Analyzer”
- The frequency for pressure drop across the catalyst for GEN 1 is not specified (Condition 6.5.2). Note the frequency should have been monthly, in accordance with current Division policy for engines operating with with controls at Title V facilities.

The first correction is typographical. Addition of the monitoring frequency is a clarification and does not reduce the stringency of the monitoring in the proposed permit. Therefore, these corrections are being incorporated directly into the permit and no additional review period is determined to be necessary.

ATTACHMENT 1 - Emission Calculations and Factors for the new GEN1 (Caterpillar G3412GA)

Point Summary of Criteria Emissions (tpy)

	Uncontrolled Requested	Controlled Requested	PTE	Proposed Control Efficiency
NOx	127.2	5.9	127.2	95.4%
VOC	8.2	4.1	8.2	50.0%
CO	8.8	11.7	11.7	NA
SOx	0.0	0.0	0.0	0.0%
TSP	0.4	0.4	0.4	0.0%
PM10	0.4	0.4	0.4	0.0%
PM2.5	0.4	0.4	0.4	0.0%
Total HAPs*	0.0	0.0	0.6	50.0%

**Uncontrolled requested and controlled requested totals include HAPs only if the uncontrolled actual values are above de minimus thresholds. PTE includes all HAPs calculated, even those below de minimus.*

Point Summary of Hazardous Air Pollutants (lb/yr)

HAP Name	Uncontrolled Requested	Controlled Requested	PTE	Proposed Control Efficiency
Formaldehyde	800	400	800	50.0%
Methanol	*	*	119	50.0%
Acetaldehyde	109	54	109	50.0%
Acrolein	103	51	103	50.0%
Benzene	62	31	62	50.0%
1,3-Butadiene	*	*	26	50.0%
Toluene	*	*	22	50.0%

**Uncontrolled requested and controlled requested values are shown only for pollutants where REQUESTED UNCONTROLLED is greater than de minimus*

Emission Factor Sources

	Uncontrolled	Controlled
NOx	mfg	JJJJ limits
VOC	mfg	JJJJ limits
CO	mfg	JJJJ limits
Formaldehyde	AP-42; Table 3.2-3 (7/2000); Natural Gas	APEN
SOx	AP-42; Table 3.2-3 (7/2000); Natural Gas	No Control
TSP	AP-42; Table 3.2-3 (7/2000); Natural Gas	No Control
PM10	AP-42; Table 3.2-3 (7/2000); Natural Gas	No Control
PM2.5	AP-42; Table 3.2-3 (7/2000); Natural Gas	No Control
Other Pollutants	AP-42; Table 3.2-3 (7/2000); Natural Gas	50% control for HAPs

ATTACHMENT 1 - Emission Calculations and Factors for the new GEN2 (Cummins GTA855F)

Point Summary of Criteria Emissions (tpy)

	Uncontrolled Requested	Controlled Requested	PTE	Proposed Control Efficiency
NOx	3.83	3.8	3.8	0.0%
VOC	0.27	0.3	0.3	0.0%
CO	0.65	0.6	0.6	0.0%
SOx	0.00	0.0	0.0	0.0%
TSP	0.0	0.0	0.0	0.0%
PM10	0.0	0.0	0.0	0.0%
PM2.5	0.0	0.0	0.0	0.0%
Total HAPs*	0.0	0.0	0.0	0.0%

**Uncontrolled requested and controlled requested totals include HAPs only if the uncontrolled actual values are above de minimus thresholds. PTE includes all HAPs calculated, even those below de minimus.*

Point Summary of Hazardous Air Pollutants (lb/yr)

HAP Name	Uncontrolled Requested	Controlled Requested	PTE	Proposed Control Efficiency
Formaldehyde	*	*	32	0.0%
Methanol	*	*	5	0.0%
Acetaldehyde	*	*	4	0.0%
Acrolein	*	*	4	0.0%
Benzene	*	*	2	0.0%
1,3-Butadiene	*	*	1	0.0%
Toluene	*	*	1	0.0%

**Uncontrolled requested and controlled requested values are shown only for pollutants where REQUESTED UNCONTROLLED is greater than de minimus*

Emission Factor Sources

	Uncontrolled	Controlled
NOx	mfg	no control
VOC	mfg	no control
CO	mfg	no control
Formaldehyde	AP-42; Table 3.2-3 (7/2000); Natur	no control
SOx	AP-42; Table 3.2-3 (7/2000); Natur	No Control
TSP	AP-42; Table 3.2-3 (7/2000); Natur	No Control
PM10	AP-42; Table 3.2-3 (7/2000); Natur	No Control
PM2.5	AP-42; Table 3.2-3 (7/2000); Natur	No Control
Other Pollutants	AP-42; Table 3.2-3 (7/2000); Natur	no control

ATTACHMENT 1 - Emission Calculations and Factors for TRK01 (truck loadout from pressurized tanks)

Emission Calculation Method: GRI HAPCalc 3.0

Point Summary of Emissions (tpy)

	Uncontrolled Requested	Controlled Requested	PTE	Proposed Control Efficiency
VOC	4.6	4.6	5.5	0.0%
Benzene	0.01	0.0	0.00624	0.0%
Toluene	0.00	0.0	0.00180	0.0%
Ethylbenzene	0.00	0.0	0.00012	0.0%
Xylenes	0.00	0.0	0.00012	0.0%
n-Hexane	0.59	0.6	0.70368	0.0%
Total HAPs	0.6	0.6	0.7	

HAPs - lbs/year	Unc.	Cont
Benzene	10.4	10.4
Toluene	3	3
Ethylbenzene	0.2	0.2
Xylenes	0.2	0.2
n-Hexane	1172.8	1172.8

ATTACHMENT 1 - Emission Calculations and Factors for P503 – 70 MMscfd Dehydrator

Operational Parameters		
Req. gas throughput	70.00	MMscfd
Inlet Gas Pressure	750.00	psig
Inlet gas temperature	54	°F
Flash Tank Pressure		
Flash Tank Temp		
Inlet Gas Water	7	lb/MMscf
Max Condenser Temp		
Condenser Pressure		
Cold Sep pressure	550	psig
Cold Sep temp	0	°F
Lean Glycol Water	20	%
Glycol Flow Rate	2.5	gpm

Emission Calculation Method:	GLYCalc 4.0
Combustor Efficiency:	90.0%

Point Summary of Emissions (tpy)

	Uncontrolled	Controlled Requested	PTE	Proposed Control Efficiency
VOC	5.8	0.6	0.6	90.0%
Benzene	1.6	0.2	0.2	90.0%
Toluene	0.3	0.0	0.0	90.0%
Ethylbenzene	0.0	0.0	0.0	90.0%
Xylenes	0.3	0.0	0.0	90.0%
n-Hexane	0.0	0.0	0.0	90.0%
Total HAPs	2.3	0.2	0.2	90.0%

GLYCalc output - at max design glycol pump rate of 2.5 gpm*

	uncontrolled		Controlled		Control Efficiency	
	flash	regen	flash	regen	flash	regen
VOC		5.8069		0.58069		0.900
Benzene		1.5916		0.15916		0.900
Toluene		0.3069		0.03069		0.900
Ethylbenzene		0.0201		0.00201		0.900
Xylenes		0.2995		0.02995		0.900
n-Hexane		0.0498		0.00498		0.900

* VOC and HAPs are in tpy from the regenerator emissions reports.

HAP Emissions in lb/year

	Unc.	Cont.
Benzene	3183.2	318.32
Toluene	613.8	61.38
Ethylbenzene	40.2	4.02
Xylenes	599	59.9
n-Hexane	99.6	9.96

		Controlled Emissions						Uncontrolled Emissions						
POINT	**Description**	**NOx**	**VOC**	**Fug VOC**	**CO**	**Reportable HAPs**	**Total HAPs**	**NOx**	**VOC**	**Fug VOC**	**CO**	**Reportable HAPs**	**Total HAPs**	**REMARKS**
010	P503 Glycol Skid		0.6			0.2	0.2		5.8			1.6	2.3	Increase throughput from 60 to 70, change op parameters to run colder; no change to emission limit
018	F701 Fugitives			10.0		0.0	0.1			10.0		0.0	0.1	No change to emission limit
023	T1681 Condensate Tank		4.7			0.1	0.2		4.7			0.1	0.2	APEN update/due date reset
027	GEN1 Generator Engine	5.9	4.1		11.7	0.3	0.3	127.2	8.2		8.8	0.5	0.6	New
028	GEN2 Backup generator engine	3.8	0.3		0.6	0.0	0.0	3.8	0.3		0.6	0.0	0.0	New
029	TRK01 Condensate Loadout		4.6			0.6	0.6		5.5			0.6	0.6	New
TOTAL		**9.7**	**14.3**	**10.0**	**12.4**	**1.1**	**1.5**	**131.0**	**24.6**	**10.0**	**9.4**	**2.8**	**3.8**	

Emission Increase due to upgrade project:

NOx:	**9.7**
VOC	**9.9**
CO:	**12.4**

Increase due to GEN1 is based on controlled emissions since there are federally enforceable emissions limits (NSPS JJJJ)

Increase due to GEN2 is based on a PTE calculated at 500 hours per year in accordance with EPA's policy on emergency backup generators

Increase due to TRK01 is based on the uncontrolled PTE, which is assumed at a throughput rate of 120% of the requested value and calculated using the same equation (i.e., vapor balance is assumed integral to the process and not an add on control)